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Peer Reviewed
Multidisciplinary
International

ISSN: 2320-3714
Volume 3 Issue 3
September 2022
Impact Factor: 10.1
Subject: Home Science

EVALUATING THE INTERVENTION OF MCI ELDERLY GROUP WITH OMEGA -3 FATTY ACIDS AND VITAMIN B12 SUPPLEMENTATION

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ABSTRACT

To better understand and diagnose the first stages of cognitive decline, the notion of mild cognitive impairment was created. Amnestic mild cognitive impairment (MCI) and MCI in general were first proposed as intermediate stages between normal ageing and Alzheimer's disease (AD). Vitamin B12 supplementation has been suggested in scientific studies as potentially protective in the treatment of neurological illnesses. These results provide credence to the idea that vitamin B12 can improve cognitive performance and preserve brain health in general. The results of this phase of the trial show that giving MCI patients supplements of vitamin B12, omega-3 fatty acids, and 20 grams of roasted flaxseeds every day for six months improved their cognitive condition, as measured by the ACE, MMSE, and MNA tests.

Keywords: Mild, Impairment, Vitamin, Supplementation, Omega.

I. INTRODUCTION

To put it simply, mild cognitive impairment (MCI) is a mental state that falls in between normal cognition and dementia. It has only been in the last few years that mild cognitive impairment (MCI) has been identified as a precursor to dementia, making it a vital topic of study for the avoidance of that disease. Despite the proliferation of pre-dementia MCI-related phrases like "isolated memory complaint" and "pre-illness," Alzheimer's these labels fail to capture the full scope of this condition. Despite the fact that MCI has a wide range of variation in its clinical manifestation, aetiology, prognosis, and prevalence, its definition remains contentious. The cognitive impairments associated with MCI have been shown in certain trials to be reversible. In the older population, it has a prevalence of 3- 19%, an incidence of 8-58 cases per 1,000 individuals per year, and a risk of 11-33% of progressing to dementia within 2 years. Disabilities and financial losses for both families and the healthcare system are significant consequences of memory impairments, which are a public health concern due to the typical 4.5-year delay between the onset of symptoms and a dementia

ISSN: 2320-3714
Volume 3 Issue 3
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diagnosis. The survival rates of patients are not tracked in Mexico. In the elderly population, MCI is thought to affect anywhere from 5 to 20% of persons. Although those with MCI may not technically have dementia, they are at increased risk for developing the disease. In this fact sheet, we will discuss mild cognitive impairment (MCI), the relationship between MCI and dementia, and the advantages of detecting MCI. Next, we'll examine mild cognitive impairment (MCI) medications, symptom management strategies, and preventative measures. When told they have MCI, many people take it as a wake-up call to make positive changes in their lives. An individual's risk of developing dementia from MCI is highly modifiable.

Some persons with MCI are already showing signs of dementia. Because of this, we know that dementia-causing brain disorders have already taken root. Due to the irreversible nature of these diseases, the symptoms of these patients will increase with time, and their condition will transition from MCI to dementia. Among those who suffer from MCI, for instance, some have experienced a slow but steady decline in their memory. As their memory declines, these individuals are at increased risk for developing Alzheimer's disease. After being evaluated by a medical professional, some patients diagnosed with MCI will be found to have another, usually treatable, cause. Negative mental states may include worry, stress, or melancholy. Constipation, an infection, impaired eyesight or hearing, a lack of vitamins or the thyroid, or pharmaceutical side effects are all possible causes of similar symptoms. Such cases will result in a diagnosis other than MCI, such as a thyroid deficit or depression. Even after a comprehensive evaluation, a doctor may not be able to determine the root cause of MCI in all cases. It could be required to observe the individual's symptoms over the course of several months.

Vitamin B12, a water-soluble vitamin necessary for proper body function, can be found in a wide range of foods, including seafood, meat, and milk products. Vitamin B12 is often combined with the other B vitamins as a vitamin B complex. It's essential for the production of DNA, the genetic material contained in all cells, and for keeping neuron and red blood cells in good health. Food protein is where you'll find vitamin B12 bonded. B12 is liberated from protein by hydrochloric acid in the stomach. In order to be absorbed into the bloodstream, B12 must first combine with a molecule called intrinsic factor (IF) once it has been released. Vitamin B12 insufficiency is exceptionally rare because the human body can store enough of the vitamin to last for years. The elderly are especially vulnerable. However, inability to utilise vitamin B12 might lead to insufficiency. Pernicious anaemia is an illness characterised by a lack of vitamin B12 absorption in the digestive tract. In addition, vegans and vegetarians who don't get enough B12 in their diets are at risk for a deficiency as well.

II. LITERARTURE REVIEW

Rebeca Mendes P. Pessoa (2019) Patients with Mild Cognitive Impairment (MCI) show signs of cognitive impairment without affecting their ability to carry out daily tasks. The purpose of this study was to conduct a systematic review of the literature about the diagnosis and prevalence of Mild Cognitive Impairment (MCI) in community-dwelling older persons. PubMed, PsycInfo, SciELO, the Web of Science, and Scopus were searched in May 2017 using the terms "epidemiology" or "prevalence," "moderate cognitive impairment," and "community." Data was collected and recorded by two separate

AIRO JOURNALS
Free / Unpaid Peer Reviewed Multidisciplinary International

ISSN: 2320-3714
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researchers. To determine the combined prevalence of MCI across all studies and among subgroups defined by diagnostic criteria, we utilised a random effect model. At first, we discovered 1996 publications, from which we ultimately chose 35 research projects. Studies were included that reported a prevalence of MCI ranging from 0.5% to 41.8%. There was substantial heterogeneity across estimates (I2 = 99.6%), with a pooled prevalence of MCI of 17.3 percent (CI 95%, 13.8 to 20.8). Important progress in this field of study would be the standardisation of diagnostic criteria for MCI and the tests used in cognitive evaluation, which would make it possible to compare studies.

Sukanya Jongsiriyanyong (2018), the range of senile dementia symptoms includes both objective and subjective forms of cognitive impairment as well as moderate cognitive impairment (MCI) and dementia. This article summarised the most recent research on mild cognitive impairment (MCI), covering topics such as diagnostic criteria for Alzheimer's, vascular cognitive impairment, and Parkinson's disease, as well as treatment options and strategies for preventing cognitive decline. Numerous investigations have been performed to identify the feasible means of protecting cognition in predementia phases, and these studies have revealed a wide range of potential causes for MCI. Aerobic exercise and other forms of lifestyle adjustment are recommended for frailty prevention and have been shown to protect cognitive function.

Janelidze et al (2018) the term "mild cognitive impairment" (MCI) is used to describe a reduction in cognitive ability compared to a person's former level of functioning, as assessed by both the patient and medical professionals. Mild cognitive impairment (MCI) is a form of cognitive decline that occurs between healthy ageing and severe dementia. The original goal of the notion of moderate cognitive impairment was to define the stage of cognitive decline before dementia. Dementia risk is well-established with mild cognitive impairment (MCI). Pharmaceutical and non-pharmaceutical therapies may find the best success in treating patients with MCI. Following is a synopsis of MCI, including definitions, prevalence data, and diagnostic criteria as they stand now, clinical strategy, and treatment options.

Petersen, Ronald C. (2016) the state of one's mind becomes more pressing a concern as one ages. Over the past two decades, the term "mild cognitive impairment" (MCI) has come to mean a level of brain function between that of healthy ageing and dementia. As a result, medical professionals need to be familiar with the issue and know how to contextualise it clinically. MCI is a frequent condition addressed by doctors, with estimates placing its prevalence between 15% and 20% in adults 60 and older based on numerous worldwide population-based research. Progression from MCI to dementia occurs at a rate of 8-15% every year, making detection and treatment of MCI all the more crucial. Biomarkers are emerging to help determine the cause of MCI and the likelihood that a patient may go on to acquire Alzheimer's disease. Not all mild cognitive impairment (MCI) is caused by Alzheimer's disease, therefore understanding the different forms might help doctors better serve their patients. If the underlying causes of the MCI can be addressed, the condition may improve. Despite the fact that many questions remain unanswered, it is crucial that doctors be familiar with the diagnostic aspects of MCI in order to provide appropriate patient care. Numerous randomised controlled studies are being done to identify effective therapies for MCI, thus it continues to be an active area of research.

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Alladi et al. (2013), moderate cognitive impairment (MCI) is still understudied, despite the growing prevalence of dementia in low- and middle-income regions. Historically, MCI has been diagnosed using a clinical profile; however, the new National Institute on Aging and Alzheimer's Association (NIA-AA) criteria now incorporate biomarkers suggestive of Alzheimer's disease pathology. The purpose of this research was to assess the prevalence of MCI at an Indian memory clinic and investigate how the updated NIA-AA criteria would fare in a country with fewer healthcare resources. The subjects included consecutive patients with mild memory complaints who were tested with clinical and neuropsychological testing, as well as the more common neuroimaging techniques. As part of standard medical care, some patients participated in research examining imaging biomarkers. A total of 226 (19.0%) of the 1,190 patients examined during the study period reported experiencing minor memory difficulties. Secondary causes often included cerebrovascular illness. According to the amended Petersen criteria, nearly half of the patients (109 out of 226) had MCI. The bulk of the men in the MCI studies were college graduates. 12 percent of the population was diagnosed with MCI and an intermediate risk of AD based on imaging biomarkers, as defined by the National Institute on Aging (NIA-AA). Because MCI is becoming more common in urban India, it was possible to use the updated NIA-AA criteria to the identification of people with MCI who have a moderate risk of developing AD.

III. RESEARCH METHODOLOGY

Vitamin B12 (methylcobalamin) injections were used in one arm of the interventional trial, whereas the other arm combined injectable vitamin B12 (methylcobalamin) with roasted flaxseeds (20 g) on a dose-dependent basis. One group received B12 intramuscular injections at the dosage recommended by the API (Association of Physicians of India, 2012): 1000 g once a day for seven days, then 1000 g once a week for four weeks, and finally 1000 g once a month for four months. The other group received omega-3 fatty acid supplements (20 gm flaxseed per day providing approx. 2.6 mg of ALA). A pilot study was performed on patients who had supplemented with 20 g flaxseeds, and no adverse effects of flaxseeds were found while evaluating their kidney and liver function profiles, ruling out any hazardous consequences posed by 20 g of flaxseeds per day. Some willing trial participants were unable to receive treatment because of untimely deaths, overseas relocations, or serious illnesses. Input was made into an MS Excel spreadsheet. After collecting the data, sorting it into proper categories, and checking its accuracy, statistical analysis was performed. Statistical analysis was performed using SPSS 20.0 for Windows. Statistics were reported as means and standard deviations. The effects of the supplements on anthropometric and biophysical parameters were compared between the two groups using the paired t-test.

IV. DATA ANALYSIS

ANTHROPOMETRIC AND BIOPHYSICAL PROFILE OF THE PATIENTS BEFORE AND AFTER THE SUPPLEMENTATION TRIAL.

There was no statistically significant difference in the prevalence of hypertension between the baseline subject groups and the MCI patient groups (Table 1).

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Table 1: Odds of hypertension between baseline and MCI subjects

Status	Baseline subjects(N= 450)	MCI patients(N= 150)	Oddsratio	p-value
NormalBloodPressure	40	15		
Hypertension	250	125	**2.01**	**0.161**^{NS}

NS- Non- significant

According to the findings, the baseline respondents were 3.92 times more likely to have a healthy body mass index than the MCI patients. There was a statistically significant difference in the prevalence of morbid obesity (BMI 30) between the two sets of people with MCI at baseline (Table 2).

Table 2: Odds of abnormal BMI values between baseline and MCI subjects

Status	Baseline subjects(N= 450)	MCI patients(N= 150)	Oddsratio	*p*-value
NormalBMI	160	35		
AbnormalBMI	150	115	**3.92**	**0.00071*****

Analyses of anthropometric and biophysical data showed no statistically significant differences between Group 1 and Group 2 (Table 3). On the other hand, both groups of MCI patients showed statistically significant decreases (p0.001) in their body mass index, waist circumference, hip circumference, systolic blood pressure, and diastolic blood pressure, with only the WHR remaining unchanged.

Table 3: Anthropometric and Biophysical profile of MCI subjects before and after supplementation

Parameters		Group1(B12) (n=60)	Group2(Flaxseeds +B12) (n=60)	*t*-test
BMI (kg/m^2)	**Pre**	26.00±5.4 2	26.51±4.70	**0.04** NS
	Post	24.99±4.8	25.64±4.55	

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	% difference **Paired*t*test**	5 3.55↓ **6.61*** **	3.95↓ **5.00*** **	
WC **(cm)**	**Pre** **Post** **% difference** **Paired*t*test**	92.62±10.15 90.36±8.99 2.60↓ **4.62*** **	94.50±9.10 91.60±10.00 3.25↓ **4.40*** **	**0.82** NS
HC **(cm)**	**PrePost** **% differencePaired *t*test**	99.80±10.00 97.0±9.30 3.00↓ **7.33*** **	99.35±9.11 97.0±9.0 2.40↓ **6.02*** **	**1.24** NS
WHR	**PrePost** **% differencePaired *t*test**	1.01±0.100 1.01±0.100 0 **1.02** NS	0.99±0.073 0.98±0.074 113↓ **1.62** NS	**1.91** NS
SystolicBP **(mmHg)**	**PrePost** **% differencePaired *t*test**	139.0±17.7 130.76±15.0 6.14↓ **6.33*** **	138.0±14.9 130.0±13.0 6.35↓ **5.81*** **	**0.42** NS

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ISSN: 2320-3714
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Diastolic BP (mmHg)	**PrePost % differencePaired *t*test**	85.90±11.0 79.0±8.85 8.20↓ **6.25*** **	84.91±9.71 80.0±9.73 6.40↓ **6.41*** **	**0.51** NS

Further, when comparing patients within Group 1 by gender and age, we found that the average BMI decrease was 3.61 percent for men, 3.74 percent for females, 4.25 percent for young adults, and 1.22 percent for seniors. Males saw a decrease of 3.01%, females of 2.35%, young-olds of 2.45%, and the elderly of 3.01% in their waist circumference. Systolic blood pressure decreased by 8.92% in males (p<0.001), 7.79% in females (p<0.001), 8.41% for young-olds (p<0.01), and 7.89% for old-olds (p<0.05) after supplementation (Table 4).

Table 4: Anthropometric and Biophysical profile of MCI subjects before and after supplementation in Group1 (B12)

Parameter	**Group1 Total (n=75)**		**Males (n=35)**	**Females (n=40)**	**60-69yrs (n=50)**	**70-85yrs (n=25)**
BMI (kg/m^2)	**Pre**	25.9±5.3	25.1±5.2	26.9±5.5	27.2±5.0	22.8±4.7
	Post	25.1±4.8	24.2±4.9	25.2±4.7	26.0±4.6	22.5±4.1
	% difference	3.46 ↓	3.42 ↓	3.57 ↓	4.16 ↓	1.14 ↓
	Paired*t* test	**6.40*** **	**4.72*** **	**4.39*** **	**7.44*** **	**0.96**^{NS}
WC (cm)	**Pre**	92.5±10.1	93.6±10.1	91.6±10.3	93.1±10.1	90.8±10.1
	Post	90.2±9.0	90.9±9.6	89.5±8.6	90.9±8.5	88.2±10.2
	% difference	2.44 ↓	2.86 ↓	2.21 ↓	2.30 ↓	2.80 ↓

	Pairedttest	**4.40*** **	**4.22*** **	**2.53***	**3.61*** **	**2.45***
HC (cm)	**Pre**	99.6±9.9	96.6±9.7	102.5±10.9	101.6±9.6	94.1±8.6
	Post	96.8±9.2	94.5±8.1	98.9±9.8	98.5±9.1	91.9±7.7
	% difference	2.89 ↓	2.18 ↓	3.50 ↓	3.07 ↓	2.35 ↓
	Pairedttest	**7.12*** **	**4.79*** **	**5.46*** **	**6.35*** **	**3.22** **
WHR	**Pre**	0.93±0.08	0.96±0.06	0.89±0.07	0.91±0.07	0.96±0.07
	Post	0.93±0.07	0.96±0.06	0.90±0.08	0.92±0.07	0.96±0.08
	% difference	0	0	1.11 ↑	1.09 ↑	0
	Pairedttest	**0.97^{NS}**	**0.83^{NS}**	**2.03^{NS}**	**1.42^{NS}**	**0.52^{NS}**
Systolic BP (mmHg)	**Pre**	138.9±17.2	144.2±17.1	134.0±16.1	135.9±16.0	147.4±18.0
	Post	130.5±14.4	134.9±15.8	126.4±11.7	129.1±14.8	134.6±12.7
	% difference	6.05 ↓	6.39 ↓	5.72 ↓	5.00 ↓	8.72 ↓
	Pairedttest	**6.12*** **	**3.76*** **	**5.54*** **	**4.36*** **	**4.90*** **
Diastolic BP (mmHg)	**Pre**	85.8±10.9	84.9±11.2	86.6±10.8	86.7±10.98	83.2±10.6
	Post	79.0±9.0	77.9±7.9	80.0±9.7	79.5±8.7	76.8±8.8
	% difference	8.13 ↓	8.92 ↓	7.62 ↓	8.28 ↓	7.75 ↓

	Paired*t*test	**6.17*****	**3.95*****	**5.24*****	**5.58*****	**2.67***

Based on the data in Table 5, we can see that the average reduction in body mass index (BMI) for patients in Group 2 ranged from 4.00% in men to 3.15% in females, 3.13% in young-olds, and 4.30% in the elderly. Males saw a 3.12% decrease, females a 3.23% decrease, young-olds a 2.72% decrease, and the elderly a 4.71% decrease in waist circumference. Systolic blood pressure was found to have decreased by 6.12% in males (p<0.01), 6.61% in females (p<0.01), 5.75% in young-olds (p<0.01), and 8.32% in the elderly after supplementation.

Table 5: Anthropometric and Biophysical profile of MCI subjects before and after supplementation in Group2 (Flaxseeds plus B12)

Parameters		**Group 2 Total(n=75)**	**Males (n=30)**	**Females (n=45)**	**60-69yrs (n=50)**	**70-85yrs (n=25)**
BMI (kg/m^2)	**Pre**	26.4±4.5	24.9 ± 3.0	27.4±4.9	26.9±4.7	25.1±3.2
	Post	25.5±4.4	23.9±2.6	26.5±5.1	26.1±4.8	24.0±2.8
	% difference	3.78 ↓	3.88 ↓	3.06 ↓	3.08 ↓	4.18 ↓
	Paired*t*test	**4.85*****	**5.31*****	**2.98****	**3.67*****	**3.48****
WC (cm)	**Pre**	94.3±8.9	93.9±7.9	94.7±9.7	94.9±9.4	92.6±7.7
	Post	91.4±9.9	91.0±7.8	91.7±11.2	92.5±10.4	88.4±8.2
	% difference	3.10 ↓	3.04 ↓	3.14 ↓	2.60 ↓	4.53 ↓
	Paired*t*test	**4.23*****	**3.13****	**3.00****	**4.36*****	**2.00^{NS}**

AIRO JOURNALS
Free / Unpaid Peer Reviewed Multidisciplinary International
ISSN: 2320-3714
Volume 3 Issue 3
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HC (cm)	**Pre**	99.5±9.0	95.4±5.8	101.7±9.9	101.3±9.1	93.2±5.6
	Post	97.0±8.8	93.6±6.9	99.2±9.3	99.2±8.5	90.8±6.7
	% difference	2.40 ↓	2.02 ↓	2.47 ↓	2.15 ↓	2.59 ↓
	Paired*t*test	**5.98***	**2.85**	**5.51***	**5.76***	**2.55***
WHR	**Pre**	0.95±0.07	0.98±0.07	0.93±0.06	0.94±0.06	0.99±0.06
	Post	0.94±0.07	0.97±0.06	0.92±0.06	0.93±0.07	0.97±0.07
	% difference	1.05 ↓	1.02 ↓	1.07 ↓	1.06 ↓	2.02 ↓
	Paired*t*test	**1.49**NS	**1.18**NS	**0.97**NS	**0.96**NS	**1.12**NS
Systolic BP	**Pre**	137.9±15.0	138.4±14.3	137.6±15.8	136.7±14.8	141.2±15.4
(mmHg)	**Post**	129.3±12.6	130.1±12.5	128.8±12.8	129.1±13.8	129.7±9.0
	% difference	6.24 ↓	6.01 ↓	6.40 ↓	5.52 ↓	8.15 ↓
	Paired*t*test	**5.48***	**4.15***	**3.87***	**4.27***	**3.48**
Diastolic BP (mmHg)	**Pre**	84.7±9.4	83.6±9.6	85.8±9.2	86.8±9.7	81.3±7.0
	Post	79.4±9.5	79.3±9.8	79.4±9.5	80.50±9.9	76.2±7.5
	%	6.29 ↓	5.14 ↓	7.47 ↓	7.24 ↓	6.21 ↓

	difference					
	Paired*t*test	**6.26*** **	**3.70** **	**5.04*** **	**5.88*** **	**2.46* **

V. CONCLUSION

Analyses of anthropometric data showed no discernible difference between Group 1 (the experimental group) and Group 2 (the control group). The experimental groups saw decreases in body mass index (BMI), waist circumference (WC), hip circumference (HC), systolic blood pressure (BP), and diastolic blood pressure (BP) (p0.001). However, there was still a minor variation in WHR. Following from the foregoing, it may be deduced that vitamin B12 and roasted flaxseeds have shown remarkable promise as supplementary treatments for MCI. Cognitive enhancement, elevated serum vitamin B12 levels, and a normalised anthropometric profile were all observed 6 months after beginning the dual supplementation regimen. Therefore, the combination of flaxseed-formulated mukhwaas and injectable doses of vitamin B12 utilised in this study should be advocated as maintenance therapy for slowing cognitive impairment in MCI.

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Volume 3 Issue 3
September 2022
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